

V. *The male genitalia of Merope tuber Newm. (Mecoptera).*  
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PLATE III.

*Merope tuber* is of interest to morphologists on account of its synthetic characters. If *Grylloblatta* be considered as an order, then *Merope* should also be given that status. But I object to it in either case, for it places stress upon certain minor differences and ignores important similarities. For the same reason I object to the Heteroptera and Homoptera being considered as two orders, as the fundamental characters upon which the order Hemiptera is founded are the shape of the mouth-parts and their functions, and these are absolutely similar and homogeneous throughout both groups. If we do separate them, then it follows logically that the Homoptera be divided into two or three orders.

In *Merope tuber* the ninth tergite is produced into two flat processes divided off from the base of the tergite by a suture. The ninth sternite is produced in the middle into a narrow process which curves upward. There is little or no division between the tergite and sternite, and together they form a complete ring. Below the bifurcate tergite is the tenth segment in the form of a semi-membranous tube with the anus at the apex. At the base of the anal segment are the cerci. From between the projecting ninth tergite and sternite, and ventrad or anterior to the anal segment, arises the genitalia in the shape of a large pair of forceps with a small copulatory organ between. The forceps consist of a large basal piece (on each side, amalgamated at their bases), and an apical joint. If we consider the base as the coxites of the ninth sternite, then the apical portion would be the styles. On the dorsal aspect the bases are joined together by a thick rim of chitin, while on the ventral aspect they have a wide connection, with a strengthening Y-shaped thickening of chitin (fig. 4 e), the forks of which surround the opening where the copulatory organ is situated.

This organ (fig. 6) consists of two pairs of small processes, an anterior or ventral pair (*h*) which are small and pointed and have their bases continued as two membranous flaps (*i*). There is a round sclerite (*k*) at the base of each of these processes, to which is attached a long strut; the posterior or dorsal pair are larger and rounded at apex (*g*). A strong chitinous apodeme (*l*) connects these processes with a strong, chitinous U-shaped body (*f*), which is attached to the framework round the orifice in the fork of the coxites. This internal structure gives attachment to the muscles which actuate the organ. The opening of the ejaculatory duct lies near the base of the anterior processes.

The penis of many insects is complex and our knowledge so slight that to attempt to homologise the various parts composing it is, at present, only a confession of faith and not a statement of fact. In certain Homoptera (*i. e.* Issidae, Ricanidae, Flatidae, Lophopidae), besides the paired genital styles (and probably a second pair amalgamated with the pygofer in the Fulgorids but found free in Tettigonidae, Membracidae and some Cercopidae), we find a penis composed of three tubes one within the other. The outer or the middle tube often bears complex appendages. In Coleoptera and some Diptera (*i. e.* Tabanidae) we find complex organs situated on the internal sac at the opening of the ejaculatory duct. When discussing the homologies of the penis it is therefore necessary to consider all these structures.

Although the coxites and styles are greatly developed in this species of *Merope*, the rest of the genitalia are not so specialised as in many of the Mecoptera.

The coxites in this species would appear to be homologous with the dorsal valvulae of the female ovipositor, and the structure between them would then represent the inner valvulae. It is this latter structure which apparently undergoes such strange developments and forms the penis, or entirely disappears and leaves a membrane on which the ejaculatory duct opens.

I have to thank Dr. R. J. Tillyard for the pleasure of dissecting this interesting insect. It is not every entomologist who would allow such a rare specimen to be cut up.

